## CLAIMS

We claim:

- 1. An isolated polypeptide of at least 15 amino acid residues comprising an epitope-bearing portion of a protein of SEQ ID NO:2 or SEQ ID NO:43.
- 2. The isolated polypeptide according to claim 1 wherein said polypeptide is selected from the group consisting of:

```
residues 15-163 of SEQ ID NO:2;
residues 46-163 of SEQ ID NO:2;
residues 15-170 of SEQ ID NO:2;
residues 46-170 of SEQ ID NO:2;
residues 15-234 of SEQ ID NO:2;
residues 46-234 of SEQ ID NO:2;
residues 15-229 amide of SEQ ID NO:2;
residues 15-230 of SEQ ID NO:2;
residues 15-345 of SEQ ID NO:2;
residues 46-345 of SEQ ID NO:2;
residues 46-345 of SEQ ID NO:2;
residues 235-345 of SEQ ID NO:2;
residues 235-345 of SEQ ID NO:2;
```

3. An isolated polypeptide comprising a sequence of amino acids of the formula  $R1_x-R2_y-R3_z$ , wherein:

R1 comprises a polypeptide of from 100 to 120 residues in length that is at least 90% identical to residues 46-163 of SEQ ID NO:2, and comprises a sequence motif  $C[KR]Y[DNE][WYF]X\{11,15\}G[KR][WYF]C$  (SEQ ID NO:4) corresponding to residues 104-124 of SEQ ID NO:2;

R2 is a polypeptide at least 90% identical to residues 164-234 of SEQ ID NO:2;

R3 is a polypeptide at least 90% identical in amino acid sequence to residues 235-345 of SEQ ID NO:2 and comprises cysteine residues at positions corresponding to residues 250, 280, 284, 296, 335, and 337 of SEQ ID NO:2; a glycine residue

at a position corresponding to residue 282 of SEQ ID NO:2; and a sequence motif  $CX\{18,33\}CXGXCX\{6,33\}CX\{20,40\}CXC$  (SEQ ID NO:3) corresponding to residues 250-337 of SEQ ID NO:2; and

each of x, y, and z is individually 0 or 1, subject to the limitations that:

at least one of x and z is 1; and if x and z are each 1, then y is 1.

- 4. The isolated polypeptide of claim 3 wherein x=1.
- 5. The isolated polypeptide of claim 4 wherein R1 comprises residues 46-163 of SEQ ID NO:2.
- 6. The isolated polypeptide of claim 4 wherein R1 is at least 90% identical to residues 18-163 of SEQ ID NO:2.
- 7. The isolated polypeptide of claim 4 wherein y=1.
- 8. The isolated polypeptide of claim 7 wherein z=1.
- 9. The isolated polypeptide of claim 3 wherein said polypeptide comprises residues 46-229 of SEQ ID NO:2, residues 164-345 of SEQ ID NO:2, or residues 46-345 of SEQ ID NO:2.
- 10. The isolated polypeptide of claim 3 wherein z=1.
- 11. The isolated polypertide of claim 10 wherein R3 comprises residues 235-345 of SEQ ID NO:2.
- 12. The isolated polypeptide of claim 10 wherein y=1.

- 13. The isolated polypeptide of claim 12 wherein x=1.
- 14. The isolated polypeptide of claim 10, further comprising cysteine residues at positions corresponding to residues 286, 287, 291, and 294 of SEQ ID NO:2.
- 15. The isolated polypeptide of claim 3, further comprising an affinity tag.
- 16. The isolated polypeptide of claim 3, further comprising an immunoglobulin constant domain.
- 17. An isolated protein comprising a first polypeptide operably linked to a second polypeptide, wherein said first polypeptide comprises a sequence of amino acids of the formula R1,-R2,-R3, wherein:

R1 comprises a polypeptide of from 100 to 120 residues in length that is at least 90% identical to residues 46-163 of SEQ ID NO:2, and comprises a sequence motif C[KR]Y[DNE][WYF]X{11,15}G[KR][WYF]C (SEQ ID NO:4) corresponding to residues 104-124 of SEQ ID NO:2;

R2 is a polypeptide at least 90% identical to residues 164-234 of SEQ ID NO:2;

R3 is a polypeptide at least 90% identical in amino acid sequence to residues 235-345 of SEQ ID NO:2 and comprises cysteine residues at positions corresponding to residues 250, 280, 284, 296, 335, and 337 of SEQ ID NO:2; a glycine residue at a position corresponding to residue 282 of SEQ ID NO:2; and a sequence motif CX{25,33}CXGXCX{10,33}CX{20,40}CXC (SEQ ID NO:3) corresponding to residues 250-337 of SEQ ID NO:2; and

each of x, y, and z is individually 0 or 1, subject to the limitations that:

at least one of x and z is 1; and if x and z are each 1, then y is 1,

and wherein said protein modulates cell proliferation, differentiation, metabolism, or migration.

- 18. The solated protein of claim 17 wherein said protein is a heterodimer.
- 19. The isolated protein of claim 18 wherein z is 1 and said second polypeptide is selected from the group consisting of VEGF, VEGF-B, VEGF-C, VEGF-D, PlGF, PDGF-A, and PDGF-B.
- 20. The isolated protein of claim 17 wherein said protein is a homodimer.
  - 21. The isolated protein of claim 20 wherein z=1.
- 22. The isolated protein according to claim 21 wherein each of said first and second polypeptides comprises residues 235-345 of SEQ ID NO:2.
  - 23. The isolated protein of claim 20 wherein x=1.
- 24. The isolated protein of claim 23 wherein each of said first and second polypeptides comprises residues 46-163 of SEQ ID NO:2.
- 25. An isolated polynucleotide of up to approximately 4 kb in length, wherein said polynucleotide encodes a polypeptide comprising a sequence of amino acids of the formula R1\_-R2\_-R3\_, wherein:
- R1 comprises a polypeptide of from 100 to 120 residues in length that is at least 90% identical to residues 46-163 of SEQ ID NO:2, and comprises a sequence motif C[KR]Y[DNE][WYF]X{11,15}G[KR][WYF]C (SEQ ID NO:4) corresponding to residues 104-124 of SEQ ID NO:2;
- R2 is a polypeptide at least 90% identical to residues 164-234 of SEQ ID NO:2;
- R3 is a polypeptide at least 90% identical in amino acid sequence to residues 235-345 of SEQ ID NO:2 and comprises

cysteine residues at positions corresponding to residues 250, 280, 284, 296, 335, and 337 of SEQ ID NO:2; a glycine residue at a position corresponding to residue 282 of SEQ ID NO:2; and a sequence motif CX 25,33 CXGXCX (10,33 CX (20,40 CXC (SEQ ID NO:3) corresponding to residues 250-337 of SEQ ID NO:2; and

each of x, y and z is individually 0 or 1, subject to the limitations that:

at least one of x and z is 1; and if x and z are each 1, then y is 1.

- 26. The polynucleotide of claim 25, wherein said polynucleotide is DNA.
- 27. The polynucleotide of claim 26 comprising nucleotides 1 through 1035 of SEQ ID NO:6.\_\_\_\_
- 28. An expression vector comprising the following operably linked elements:
  - a transcription promoter;
  - a DNA polynucle cide accoding to claim 26; and
  - a transcription terminator.
- 29. The expression vector of claim 28, further comprising a secretory signal sequence operably linked to the DNA polynucleotide.
- 30. A cultured cell into which has been introduced an expression vector according to claim 28, wherein said cell expresses the polypeptide encoded by the DNA segment.
- 31. A composition comprising a protein according to claim 17 in combination with a pharmaceutically acceptable vehicle.
  - 32. A method of producing a protein comprising:

culturing a cell into which has been introduced an expression vector according to claim 28, whereby said cell expresses the polypertide encoded by the DNA segment; and recovering the expressed protein.

- 33. An antibody that specifically binds to an epitope of a polypeptide according to claim 3.
- 34. The antibody of claim 33 which is a monoclonal antibody.
- 35. The antibody of claim 33 which is a single-chain antibody.
- 36. The antibody of claim 33 operably linked to a reporter molecule.
- 37. A method for detecting a genetic abnormality in a patient, comprising:

obtaining a genetic sample from a patient;

incubating the genetic sample with a polynucleotide comprising at least 14 contiguous nucleotides of SEQ ID NO:1 or the complement of SEQ ID NO:1, under conditions wherein said polynucleotide will hybridize to complementary polynucleotide sequence, to produce a first reaction product; and

comparing said first reaction product to a control reaction product, wherein a difference between said first reaction product and said control reaction product is indicative of a genetic apprormality in the patient.

- 38. A method of stimulating the growth of fibroblasts or smooth muscle cells comprising applying to said cells an effective amount of a protein of claim 17.
- 39. A method of activating a cell-surface PDGF alpha receptor, comprising exposing a cell comprising a cell-

surface PDGF alpha receptor to the protein of claim 17, whereby the protein binds to and activates the receptor.

- 40. A method of inhibiting a PDGF alpha receptor-mediated cellular process, comprising exposing a cell comprising a cell-surface PDGF alpha receptor to a compound that inhibits binding of the protein of claim 17 to the receptor.
- 41. A method of inhibiting zvegf3 activity in a mammal comprising administering to the mammal an effective amount of a zvegf3 antagonist.
- 42. The method of claim 41 wherein the antagonist is an antibody, a receptor, a ligand-binding receptor fragment, or a receptor IgG-Fc fusion protein.
- 43. An isolated, antisense polynucleotide that is the complement of the isolated polynucleotide of claim 25.
- 44. The antisense polynucleotide of claim 43 further comprising operably linked transcription promoter and terminator sequences.
- 45. A method of inhibiting zvegf3 production in a cell comprising administering to the cell the antisense polynucleotide of claim 44.